

REMARKS

Applicants request favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 1-15 and 20 are presented for consideration. Claims 1 and 7 are independent. Claims 16-19 have been canceled without prejudice or disclaimer. Claims 1-6 have been amended to clarify features of the subject invention, while claim 20 has been added to recite additional features of the subject invention. Support for these changes and this claim can be found in the original application, as filed. Therefore, no new matter has been added.

Applicants note with appreciation that claims 7-14 have been allowed over the art of record. In addition to these claims being allowable, Applicants submit that claims 1-6, 15 and 20 patentably define features of the subject invention. Therefore, Applicants request favorable reconsideration and withdrawal of the rejection set forth in the above-noted Office Action.

Claims 1-6 and 15-19 were rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 5,834,783 to Muraki et al. in view of U.S. Patent No. 5,863,682 to Abe et al. Applicants submit that the cited art does not teach many features of the present invention as previously recited in independent claim 1. Therefore, this rejection is respectfully traversed. Nevertheless, Applicants submit that independent claim 1, as presented, amplifies the distinctions between the present invention and the cited art.

In one aspect of the invention, independent claim 1 recites a charged particle beam exposure apparatus that draws a pattern on an object to be exposed by irradiating a plurality of charged particle beams to the object based on drawing data. The apparatus includes (a) a storage

device for storing (i) standard dose data which represents an irradiation duty of each of the plurality of the charged particle beams on each of the irradiation positions to the object, depending on the pattern, (ii) proximity effect correction data for reducing an influence of a proximity effect, and (iii) calibration data for reducing irradiation dose variations among the plurality of the charged particle beams, and (b) a computing device for correcting the standard data by the proximity effect data with respect to the irradiation duty on each of the irradiation positions and calibrating the standard data by the calibration data with respect to the irradiation duty of each of the plurality of the charged particle beams, to generate the drawing data.

By such an arrangement, in the present invention, as recited in independent claim 1, drawing data can be generated by performing proximity effect correction on each irradiation position so that variations in an irradiation dose in each charged particle beam can be calibrated. In this manner, it is possible to make it easy to maintain two different correction cycle data, that is, proximity effect correction data and calibration data, for example.

Applicants submit that the cited art does not teach or suggest such features of the present invention as recited independent claim 1.

The Examiner relies on the Muraki et al. for teaching a multi-beam apparatus that includes a storage device and which uses calibration data for correcting variations in an irradiation dose. As noted by the Examiner, however, the Muraki et al. patent does not teach or suggest anything regarding proximity effect correction, or the use of standard dose data. Accordingly, the Muraki et al. patent does not teach or suggest many features of the present invention, as recited in independent claim 1.

Applicants further submit that the remaining art cited does not cure the deficiencies noted above with respect to the Muraki et al. patent.

The Abe et al. patent teaches proximity effect correction in an exposure apparatus utilizing single beams. The Abe et al. patent, however, is not directed to an exposure apparatus that utilizes multi-beams in the manner of the present invention recited in independent claim 1. Applicants further submit that this patent does not teach or suggest calibrating variations in an irradiation dose in the manner of the present invention recited in independent claim 1.

Applicants submit, therefore, that the Abe et al. patent likewise does not teach or suggest the salient features of Applicants' present invention as recited in independent claim 1. Accordingly, Applicants submit that the Abe et al. patent does not cure the deficiencies noted above with respect to the Muraki et al. patent.

Still further, Applicants submit that a combination of the teachings of the Muraki et al. and Abe et al. patents would not teach or suggest Applicants' present invention as recited in independent claim 1. In this regard, Applicants submit that the proximity correction effect in an exposure apparatus utilizing a single beam, as in the Abe et al. arrangement, and the calibration of variations in an irradiation dose in an exposure apparatus utilizing multi-beams, as in the Muraki et al. arrangement, would not suggest generating drawing data by performing proximity effect correction on each irradiation position and calibrating variations in an irradiation dose in each charged particle beam, as in the present invention recited in independent claim 1. In this regard, Applicants submit that proximity effect correction data and calibration data of variations

in an irradiation dose have different correction cycles, such that combining the two would not be taught or suggested by a combination of the teachings of the Muraki et al. and Abe et al. patents.

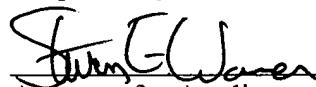
For the reasons noted above, Applicants submit that the present invention, as recited in independent claim 1, also is patentably defined over the cited art.

Dependent claims 2-6, 15 and 20 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicants further submit that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejection set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,

  
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